



PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Docket No: Q61222

Toshiro HAYAKAWA

Appln. No.: 09/779,586

Group Art Unit: 2828

Confirmation No.: 6818

Examiner: Cornelius H. Jackson

Filed: February 09, 2001

For: LASER APPARATUS INCLUDING SURFACE-EMITTING SEMICONDUCTOR
EXCITED WITH SEMICONDUCTOR LASER ELEMENT, AND DIRECTLY
MODULATED

RESPONSE UNDER 37 C.F.R. § 1.111

Commissioner for Patents
Washington, D.C. 20231

Sir:

In response to the Office Action dated June 20, 2002, please consider the remarks as submitted herewith.

Claims 1-13 are all the claims pending in the application.

Claims 1-4 and 6-13 are rejected under 35 U.S.C. § 102(b) as being anticipated by Jayaraman (US 5,513,204). The rejection of claims 10 and 11, although not clear from the Office Action, was verified during a telephone conversation with the Examiner on August 7, 2002. Claim 5 is objected to as being dependent on a rejected base claim, but would be allowable if rewritten in independent form, including all of the limitations of the base claim and any intervening claims. While gratefully acknowledging the indicated allowability of claim 5, Applicant respectfully traverses the rejection as detailed below.

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Jayaraman relates to a long wavelength vertical cavity surface emitting laser (VCSEL) which is optically pumped with a short wavelength VCSEL. As shown in FIG. 3, Jayaraman discloses two short wavelength VCSELs 43 optically pumping two long wavelength VCSELs 40. Lasers 43 are a pair of electrically pumped, short wavelength VCSELs, which include a short wavelength active region 31 interposed between short wavelength mirrors 32. Short wavelength radiation is emitted from a top surface 33 of VCSELs 43 into the bottom surface of a second pair of VCSELs 40. VCSELs 40 are a pair of long wavelength VCSELs comprised of a long wavelength active region 35 interposed between a bottom mirror 36 and top mirrors 37. Mirrors 36 and 37 are long wavelength mirrors. Mirror 36 is transparent to the short wavelength radiation emitted by VCSELs 43. Long wavelength radiation is emitted from top mirrors 37. Modulation of the long wavelength radiation is accomplished by modulating the short wavelength pump VCSELs.

Claims 1 and 12 each require "a second mirror which is arranged outside said surface-emitting semiconductor element so that said first and second mirrors form a resonator in which said second laser light resonates." This feature of the present invention can be seen, for example, in FIG. 2A in which a second mirror 35 is arranged outside a surface of a surface-emitting semiconductor element 23. Applicant submits that Jayaraman fails to teach or suggest this limitation of the claims. The Examiner asserts that the mirrors 37 of the reference correspond to the claimed second mirror, but Applicant disagrees. The mirrors 37 are arranged inside the surface of the VCSELs 40, as shown in FIG. 3. In fact, the mirrors 37 are part of the VCSELs 40. Thus, the mirrors 37 of Jayaraman do not correspond to the claimed second mirror of claims 1 and 12.

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Furthermore, it would not have been obvious to modify Jayaraman's lasers to include the claimed second mirror which is arranged outside a surface-emitting semiconductor element, since Jayaraman's disclosure is focused on VCSELs which are joined together. See abstract.

Therefore, Applicant submits that claims 1 and 12 and their dependent claims 2-11 and 13, respectively, are allowable over the prior art.

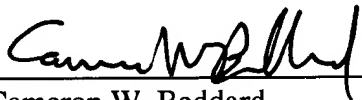
With further regard to claims 3, 4, 6-8, 10, and 11, the Examiner concedes in paragraph 8 of the detailed action that Jayaraman does not include features of these claims. The present record would indicate that the claims are allowable.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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